AMENDMENTS TO THE CLAIMS

Claims 1-4. Canceled

5. (Currently amended) An optical pick-up to perform recording or reproducing of information for a first optical recording medium with a light beam of wavelength λ1, a thickness t1 of a substrate thereof, and a numerical aperture NA1 for use thereof and a second optical recording medium with a light beam of wavelength λ1, a thickness t2 (>t1) of a substrate thereof, and a numerical aperture NA2 (<NA1) for use thereof, comprising:

an aberration generation device configured to generate coma aberration or spherical aberration for a beam focused by an objective lens;

a device configured to perform a first control operation comprising:

a first step of, when a medium determination device configured to determine which of the first and second optical recording media is set determines that the first optical recording medium is set, setting a quantity of the coma aberration generated by the aberration generation device to a predetermined stored value,

a second step of varying a quantity of the spherical aberration generated by the aberration generation device to determine and store a driving condition of the aberration generation device, wherein the driving condition is a condition for which an amplitude of a recording information signal or a track error signal is at a maximum, and

a third step of performing an operation of recording or reproducing while a quantity of the spherical aberration is added based on the driving condition; and

a device configured to perform a second control operation comprising:

a fourth step of, when the medium determination device determines that the second optical recording medium is set, setting a quantity of the spherical aberration generated by the aberration generation device to a predetermined stored value,

a fifth step of varying a quantity of the coma aberration generated by the aberration generation device to determine and store a driving condition of the aberration generation device, wherein the driving condition is a condition for which an amplitude of a recording information signal or a track error signal is at a maximum, and

a sixth step of performing an operation of recording or reproducing while the quantity of the coma aberration is added based on the driving condition,

wherein the aberration generation device is controlled by the device for the first and second control operations,

wherein the objective lens is a lens providing a best aberration for the first optical recording medium and is provided with an aberration compensation element comprising a diffraction element or a phase shifter element between the objective lens and the aberration generation device, and

wherein the aberration compensation element is provided with a diffraction element whereby recording or reproducing is made using light beams with selectively different diffraction orders dependent on an optical recording medium.

6. (Previously presented) The optical pick-up as claimed in claim 5, wherein

the aberration generation device is composed of two lenses with refractive powers different from each other and a driving device,

at least one of the lenses is moved by the driving device along a direction of an optical axis to generate spherical aberration, and

the other lens is moved by the driving device along a direction orthogonal to the optical axis to generate coma aberration.

7. (Original) The optical pick-up as claimed in claim 5, wherein the aberration generation device has an electrode pattern configured to generate coma aberration and an electrode pattern configured to generate spherical aberration and is a liquid crystal element that sandwiches a liquid crystal layer.

8. (Original) The optical pick-up as claimed in claim 5, wherein the aberration generation device generates coma aberration in a radial direction of the optical recording medium.

9. (Original) The optical pick-up as claimed in claim 5, wherein the aberration generation device generates under-spherical aberration at a time of recording or reproducing for the first optical recording medium and generates over-spherical aberration at a time of recording or reproducing for the second optical recording medium, at a center point of a beam focused by the objective lens to which beam no aberration is added.

10. (Original) The optical pick-up as claimed in claim 5, wherein a value on a condition on which aberration is best or an information signal is best in a process of assembling the optical pick-up is stored as the predetermined value, which value is used as a center point of the spherical aberration or the coma aberration generated by the aberration generation device.

Claims 11-12. Canceled

13. (Currently amended) [[The]] An optical pick-up ~~as claimed in claim 11,~~ to perform recording or reproducing of information for a first optical recording medium with a light beam of wavelength $\lambda 1$, a thickness t1 of a substrate thereof, and a numerical aperture NA1 for use thereof and a second optical recording medium with a light beam of wavelength $\lambda 1$, a thickness t2 ($>$t1) of a substrate thereof, and a numerical aperture NA2 ($<$NA1) for use thereof, comprising:

an aberration generation device configured to generate coma aberration or spherical aberration for a beam focused by an objective lens;

a device configured to perform a first control operation comprising:

a first step of, when a medium determination device configured to determine which of the first and second optical recording media is set determines that the first optical recording medium is set, setting a quantity of the coma aberration generated by the aberration generation device to a predetermined stored value,

a second step of varying a quantity of the spherical aberration generated by the aberration generation device to determine and store a driving condition of the aberration generation device, wherein the driving condition is a condition for which an amplitude of a recording information signal or a track error signal is at a maximum, and

a third step of performing an operation of recording or reproducing while a quantity of the spherical aberration is added based on the driving condition; and

a device configured to perform a second control operation comprising:

a fourth step of, when the medium determination device determines that the second optical recording medium is set, setting a quantity of the spherical aberration generated by the aberration generation device to a predetermined stored value,

a fifth step of varying a quantity of the coma aberration generated by the aberration generation device to determine and store a driving condition of the aberration generation device, wherein the driving condition is a condition for which an amplitude of a recording information signal or a track error signal is at a maximum, and

a sixth step of performing an operation of recording or reproducing while the quantity of the coma aberration is added based on the driving condition,

wherein the aberration generation device is controlled by the device for the first and second control operations,

wherein the objective lens is a lens providing a best aberration for the first optical recording medium and is provided with an aberration compensation element comprising a diffraction element or a phase shifter element between the objective lens and the aberration generation device, and

wherein the diffraction element is molded with the objective lens as one unit and a diffraction grating is formed on a surface of the objective lens at a side of a light source.

Claims 14-37. Canceled

38. (Original) An optical information processing apparatus to perform recording or reproducing of information for an optical recording medium, wherein the optical pick-up as claimed in claim 5 is provided.

Claims 39-42. Canceled